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Original Paper

Cost Efficiency of the Ghanaian Banking Sector: The Post-Liberalisation Experience

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Abstract

Using data from 1997 to 2008, this paper investigates the cost efficiency of the Ghanaian banking sector after financial liberalisation. The Ghanaian bank with the highest efficiency score is found to be operating at maximum possible efficiency. The average bank is however operating at high costs. Despite mixed evidence in the literature, there is the received wisdom that most cross-border mergers and acquisitions post-liberalisation result in failure due to factors that include poor credit quality, inadequate generation of fee income, and poor customer mix. In Ghana, the situation is different because the only foreign-acquired bank had prior knowledge of the local conditions and has managed to utilise this advantage, coupled with redundancy programmes and layoffs and without branch expansion following the acquisition, to operate at a relatively high level of cost efficiency.

Keywords

Cost efficiency, banks, financial liberalisation, governance, size

JEL classification: D24, G21, G28, G34, L11

1. Introduction

A considerable amount of attention has been devoted to the efficiency of financial institutions over the past few decades. As noted by Berger and DeYoung (1997), the strand of research which investigates the productive efficiency of financial institutions with respect to the 'best practice' efficient frontier argues that the average firm incurs high costs and generates low profits. The central purpose of this study is to examine the effects of financial sector reforms on the efficiency of the Ghanaian banking system, and to evaluate the efficacy of the reform policy.

Given that financial liberalisation has been introduced in many economies over the past few decades, studies on banking system efficiency suggest the need to investigate the operational inefficiencies in African reforming economies. The reforms introduced in these countries have allowed interest rates to

be set by the market, and have permitted banks to lend on commercial considerations alone. It is expected that these practices would lead to greater competition amongst banks whose objective, in a liberalised economy, is to maximise profit. Proponents of liberalisation suggest that the banking system will become more efficient through competition, but the evidence is mixed (Note 1). There are different ways of measuring efficiency, and the measures are not necessarily correlated. For example, an examination of Korean data (Cho, 1988) suggests that, following liberalisation, allocative efficiency was improved. This implies that the rate of return from investment in different sectors to which the banks continued lending following liberalisation were equalised. This indicates a better allocation of loans to maximise profit. Amsden and Euh (1993) point out that Korea has achieved its objectives of modernising its financial sector, not because it relied exclusively on market forces to achieve desired goals, but rather by principally creating institutions or modelling old ones. The authors assert that the functional efficiency of Korean banks may be considered the most important performance-effect that the first round liberalisation achieved, and that, this type of efficiency has tended to be less heavily emphasised than allocative efficiency by advocates of financial liberalisation. Considering the high operating cost of Ghanaian banks, this argument is developed examining how functioning institutions have affected the efficiency of the Ghanaian banking system. More specifically, it is aimed to investigate how the market structure and regulatory framework under which the banks operate affect their efficiency.

Of particular concern is the received wisdom in the literature that most mergers and acquisitions post-liberalisation result in failure. Whereas some of the failures have been attributed to factors that include poor credit quality and inadequate generation of fee income, resulting in additional costs generated by the merger (Knapp et al., 2005), others have been attributed to poor customer mix post acquisition (Havrylchyk, 2006). The experience is however different in the Ghanaian context because the only foreign-acquired bank had prior knowledge of the local conditions and has managed to utilise this advantage, coupled with redundancy programmes and layoffs and without branch expansion following the acquisition, to operate at a relatively high level of cost efficiency.

This study contributes to the established literature on the impact of financial liberalisation in Africa. Studies that have investigated banking system efficiency in both developed and emerging economies have yielded mixed results, due to different macroeconomic and sectoral conditions prior to the financial reforms. Many of these studies have focused on periods when some of these reforms had not been fully implemented. The present study examines a period following the implementation of all of the phases of the liberalisation process in the Ghanaian banking industry. This should help critically assess the benefits and non-benefits of the reforms. The results presented in this paper are among the earliest indications of the effects that financial sector reforms have had on the banking system efficiency in sub-Saharan Africa.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature surrounding the research topic. The empirical model employed is described in section 3, alongside

description of data used in the study. Section 4 presents the results and discussion of the study, followed by the conclusion in section 5.

2. Financial Liberalisation and Bank Efficiency: The Literature

The efficiency literature has grown rapidly over the past few decades. The vast majority of the studies covers the US and European countries (See, for example, Berger & Humphrey, 1997; Goddard et al., 2007; Asaftei, 2008; Beijnen & Bolt, 2009).

Efficiency studies on developing economies are less plentiful. The majority of the studies of emerging market banking systems after financial liberalisation refer to Asian countries including India (Das & Ghosh, 2006), Singapore (Rezvanian & Mehdian, 2002), Hong Kong (Drake et al., 2006), Malaysia (Okuda et al., 2002) and China (Berger et al., 2009). Cross-country studies of Asian banking system efficiency have also been undertaken (Williams & Nguyen, 2005).

Efficiency studies have also been reported for a number of countries in Central and Eastern Europe, as well as the Commonwealth of Independent States (Bonin et al., 2005; Koutsomanoli-Filippaki et al., 2009). In sub-Saharan Africa, bank efficiency studies after financial liberalisation cover economies including Uganda (Hauner & Peiris, 2005) and Botswana (Moffat & Valadkhani, 2008).

It is expected that financial sector reforms should increase competition, leading to improvements in bank efficiency. The empirical evidence has however been mixed. In a study of the Ugandan banking system between 1999 and 2004, Hauner and Peiris (2005) find that the level of competition has increased significantly and has been associated with an improvement in efficiency following liberalisation. Ataullah and Le (2006) report an improvement in the efficiency of Indian banks, especially foreign-owned banks, after financial reforms. Havrylchyk (2006) however finds that efficiency has not improved in the Polish banking industry between 1997 and 2001.

The comparison of efficiency between foreign- and domestic-owned banks suggests that foreign banks in emerging market economies have been able to utilise their advantages by achieving higher efficiency than their domestic peers (Hasan & Marton, 2003; Bonin et al., 2005). Hauner and Peiris (2005) show that on average foreign-owned banks are more efficient than domestic banks in Uganda. Moffat and Valadkhani (2008) find that foreign institutions exhibit higher levels of efficiency than public institutions in Botswana. In the case of the Polish banking industry, Havrylchyk (2006) finds that greenfield banks have been able to achieve higher levels of efficiency than their domestic peers, whilst foreign banks that acquired domestic firms had not succeeded in improving their efficiency.

Empirical studies on the relationship between bank size and efficiency have also produced mixed results of the impact of financial liberalisation on bank efficiency. Hauner and Peiris (2005) find larger banks to be more efficient than smaller banks in the Ugandan banking system. Moffat and Valadkhani (2008) show that small and large institutions have higher levels of efficiency than medium-sized banks in Botswana.

3. Methodology and Data

3.1 The Cost Efficiency Model

Under a liberalised financial system, banks are expected to realise efficiency gains via reorganisation with "prices reducing towards production costs under the pressure of competition" (Gardener et al., 2001). Operating cost (OC) is used as dependent variable in the efficiency model and this variable is proxied as the sum of personnel and other non-interest expenses.

The intermediation approach to modelling bank production is employed. This approach assumes banks to perform an intermediation role between depositors and borrowers. From this perspective, banks are considered to be intermediators of financial services that purchase inputs in order to generate earning assets as output (Sealey & Lindley, 1977).

More precisely, the value-added approach to the intermediation process is used, and estimate efficiency from the cost function by specifying two outputs (loans and deposits) and two inputs (price of labour and price of deposits). These categories of loans (LN) and deposits (DP) are considered as the key outputs, because they generate the great majority of value added. The price of labour is proxied as the ratio of personnel expenses to total assets, whereas the price of deposits is proxied as the ratio of interest expenses to the value of total deposits. These two variables enter the regression as the ratio of labour cost to the price of deposits (w). The dependent variable (OC) also enters the regression divided by the price of deposits.

A time trend variable (T) is included to account for the effects of technological change, together with other factors such as regulatory change. This captures the missing time dimension that is not explicitly modelled in the cost function.

Three bank-specific indicators that capture credit, capital and liquidity risk are also included to control for differences in the banks' risk profile, since measured efficiency may reflect variation in risk-taking strategies across banks.

Credit risk (CRD) is measured as the ratio of provisions for bad and doubtful debts to gross loans; capital risk (CAP) as the ratio of shareholders' funds to total assets; and liquidity risk (LIQ) as the ratio of liquid assets to total bank liabilities.

On the basis of the aforementioned variable definitions, the preferred cost efficiency model is specified using a two-output, two-input translog functional form. The efficiency estimate is derived from a cost function (1):

$$\ln OC_{it} = \alpha_0 + \sum \beta_p \ln w_{it} + \beta_L \ln LN_{it} + \beta_D \ln DP_{it} + \frac{1}{2}\sum\sum \beta_{PP} (\ln w_{it})^2$$

$$+ \frac{1}{2}\beta_{LL} (\ln LN_{it})^2 + \frac{1}{2}\beta_{DD} (\ln DP)^2 + \beta_{LD} \ln LN_{it} \ln DP_{it}$$

$$+ \sum \beta_{PL} \ln w_{it} \ln LN_{it} + \sum \beta_{PD} \ln w_{it} \ln DP_{it} + \sum \wp_{TP} T \ln w_{it}$$

$$+\wp_{TL}T\ln LN_{it}+\wp_{TD}T\ln DP_{it}+\wp_{T}T+\frac{1}{2}\wp_{TT}T^{2}+\theta_{R1}CRD_{it}$$
$$+\theta_{R2}CAP_{it}+\theta_{R3}LIQ_{it}+v_{it}+u_{it} \quad (1)$$

where for the *i*-th bank in the *t*-th time period, $\ln OC_{it}$, $\ln w_{it}$, $\ln LN_{it}$, and $\ln DP_{it}$ denote the natural logarithms of operating cost, input prices of labour and deposits, as well as loans and deposits for bank outputs, respectively; T captures the effects of technical progress (including linear and quadratic time trend, as well as trend interaction terms); CRD_{it}, CAP_{it}, and LIQ_{it} represent the natural logarithms of the variables controlling for credit, capital and liquidity risk; and v_{it} is a random noise variable that is distributed independently and identically according to standard normal distribution, whereas u_{it} is a non-negative random variable that captures the effects of inefficiency and is assumed to be independently but not identically distributed according to a truncated-normal distribution.

3.2 Correlates of Bank Inefficiency

After estimating cost efficiency measures for Ghanaian banks, one may investigate further the factors that are correlated with bank inefficiency. To do this, the conditional mean model of Battese and Coelli (1995) is employed, which allows in a one-step procedure estimation of the cost function and identification of the correlates of bank inefficiency. Inefficiency scores are first derived from the model, and then, express these scores as an explicit function of a vector of predictor variables which in this case measure characteristics of functioning institutions.

The institutional variables employed to investigate the factors that are correlated with bank inefficiency include bank governance, competition, and bank size. These are discussed below.

3.2.1 Bank Governance

The issue of bank governance has been of concern to researchers since financial liberalisation was introduced in a number of reforming economies (Note 2). This has resulted in a proliferation of efficiency studies on bank ownership in recent decades. Causes of changes in ownership and other organisational restructuring include both domestic and foreign mergers and acquisitions, privatisation, restructuring of distressed banks, and bank closures.

The approach to measuring bank governance has varied with respect to the economies concerned, managerial structure and data availability. According to Berger et al. (2005), it is important to control for all of the major governance changes that affect the performance of an economy's banking sector in order to avoid misspecification, bias and misleading results. For this reason, several authors have developed a framework that captures the static, selection, and dynamic effects of changes in bank governance on bank performance. Governance changes are usually specified using dummy variables. Due to data constraints, the method applied in this study only includes three static variables for foreign-owned, private domestic-owned and state-owned banks; one selection variable for cross-border merger and acquisition; and two dynamic variables for the selection dummy that include both short- and long-term performance effects for the bank concerned (see below).

It is important to note that all the state-owned banks in Ghana underwent some form of restructuring during the reform period, and this included recapitalisation from public funds, the removal from balance sheets of non-performing assets, and the appointments of new boards of directors and senior executives. As mentioned earlier, the limited data sample for this study does not permit to investigate the selection and dynamic effects of the state-owned banks from the period these changes occurred. Hence, these changes are treated as long-run static effects, because the government remained the majority equity stake holder in these banks during the study period.

Due to the aforementioned data constraints, I am unable to measure the selection and dynamic effects of foreign- and private domestic-owned banks from the period the government relinquished its part or entire minority shareholding in them. For this reason, I also treat these changes as long-run static effects in cases where foreign or private domestic owners retained majority shareholdings throughout the sample period. Many studies in the academic literature have applied these methods to investigate the performance effects of different types of bank ownership (see, for example, Fries & Taci, 2005; Lensink et al., 2008).

Following Nakane and Weintraub (2005) and Williams and Nguyen (2005), one exit variable is also included which identifies two state-owned banks that were liquidated. Unlike most ownership studies, this paper follows the approach of Fries and Taci (2005) by introducing two entry variables that capture newly established foreign and domestic banks that entered the market during and after the reforms.

Initially, I focus on the static effects of foreign-ownership *(STATIC_FOR)*, private domestic-ownership *(STATIC_DOM)* and state-ownership *(STATIC_STA)* on the bank efficiency. Static dummy variables are created for these banks and assume that they have not undergone any major change in ownership composition over the sample period, and that they were still active at the end of the sample period. These dummy variables take the value of one for the banks concerned for all time periods, and zero for other periods and for all other banks.

The literature suggests that the efficiency of foreign-owned banks in emerging economies differs from both private domestic-owned and state-owned banks. Foreign banks are assumed to possess superior management practices and technological advantage over local banks, and as such, are expected to capitalise on their advantages and exhibit higher efficiency levels than their local peers (Claessens et al., 2001). Following the literature on foreign banking, a bank is defined as foreign if more than 50% of its shares are owned by non-domestic residents. A static dummy variable is specified for foreign ownership *(STATIC_FOR)* that takes the value of one for all periods, and zero otherwise.

Contrary to the above discussion on foreign ownership, it has also been suggested that the opening of financial markets to foreign competition may increase the cost of domestic banks' operations. Stiglitz (1993) as cited in Claessens et al. (2001) discusses the effects of foreign bank entry on the costs of domestic banks, local entrepreneurs and the government. It is however possible that domestic banks in developing countries have informational advantages over their foreign peers, and as such, could operate at higher efficiency levels than foreign-owned banks. Moreover, domestic banks are expected to

replicate and assimilate the modern banking technology and skills introduced by foreign banks, which as a consequence, should improve their efficiency. A bank is defined as private domestic if more than 50% of its shares are owned by domestic residents. A static dummy variable is specified for private domestic ownership *(STATIC_DOM)* that takes the value of one for all periods, and zero otherwise.

State-owned banks are generally considered to be less efficient than privately-owned banks (Beck et al., 2005a, 2005b; Nakane & Weintraub, 2005). In a case where government banks account for a substantial share of an entire banking market, non-commercial criteria may frequently be used to allocate credit, with resulting upward pressure on cost inefficiency. The argument behind the inefficiency of government banks is framed along the three alternative theories of state ownership: social, political, and agency (Sapienza, 2004). While the social view of state ownership assumes that state-owned enterprises (SOEs) are created to address market failure in financial and credit markets (Megginson, 2005), the political view assumes state-owned enterprises (SOEs) to be inefficient due to deliberate policies of politicians of diverting resources to their supporters (La Porta et al., 2002). The agency view on the other hand supports the idea of the social view that state-owned enterprises (SOEs) are created to maximise social welfare, but are subject to an inherent tendency to generate corruption and misallocation (Banerjee, 1997; Hart et al., 1997).

After major financial sector reforms, one would expect the inefficiencies in state-owned banks to decline through the strengthening of operational procedures and the existence of improved supervisory and regulatory systems. A bank is defined as state-owned if more than 50% of its shares are held by the government. A static dummy variable is specified for state ownership *(STATE_STA)* that takes the value of one for all periods, and zero otherwise.

During a period of liberalisation, it is common to observe banks withdrawing from the market by means of liquidation or through the change of activities from either a specialised operation into something else, or transfer of their assets and liabilities to other banks through merger and acquisition. In Ghana, due to insolvency, a small number of state-owned banks were liquidated during the reform period. For this reason, exit dummy variables are defined for liquidated state-owned banks *(EXIT)*, and specify these dummies to take the value of one for the closed banks during all the periods for which they are present in the sample, and zero otherwise.

As governments remove controls on entry, it is common for new foreign and private domestic banks to enter the industry. The Ghanaian banking system is seen to be expanding in numbers as new banks find their way into the reforming economy. Entry dummy variables are measured for both newly established foreign *(ENTRY_FOR)* and private domestic *(ENTRY_DOM)* banks, and specify separately these dummies to take the value of one for all the periods in which they are present in the sample, and zero otherwise.

Furthermore, mergers and acquisitions involving banks have been common in developing countries during and after periods of financial reform. Due to data constraints, I am unable to investigate the only domestic merger and acquisition deal that took place during the reform period. However, the same bank

(Social Security Bank of Ghana) that underwent domestic merger and acquisition was, in 2004, merged with and acquired by Societele Generale of France under a new name, SG-SSB Ltd, with 51% share ownership. This is the only cross-border merger and acquisition recorded in the Ghanaian banking industry since the reforms took place, and the data sample permits investigation of its inefficiency effects. Selection and dynamic dummy variables are created for the merged and acquired bank.

The selection dummy variables are created for banks that have been involved in some form of ownership change over the sample period. For this reason, a dummy variable *(SELECT_FOR)* is specified to take the value of one for all periods of a bank that underwent cross-border merger and acquisition, and zero otherwise.

The dynamic dummy variables on the other hand are created for those banks for which the selection dummies take the value of one to date the exact moment when the ownership change took place, and zero otherwise. In other words, the dynamic dummy variables *(DYNAM)_ST)* take the value of one for the bank concerned for all the time periods following a given intervention, and zero for the periods prior to the intervention and for all periods for a bank that has not undergone any ownership change. This treatment is assumed to identify the short-term performance effect of the intervention.

The dynamic dummy variable is assumed to capture the once-and-for-all changes associated to a certain intervention. In addition to this level effect, however, Nakane and Weintraub (2005) note that the effect of intervention may be realised cumulatively over a period of time. For this reason, an additional dummy variable *(DYNAMIC_LT)* is created to measure the time that has lapsed since the intervention occurred. Under normal circumstances, the dynamic time dummy variable takes the value of one in the year when the intervention occurred, the value two in the following year, and so on. However, all observations in the year when the intervention took place are excluded from the sample. Thus, the dynamic time dummy variable, which reflects a long-term performance effect, starts with zero prior to the intervention and two for the second year following the ownership change. The intuition behind this treatment as noted by Nakane and Weintraub (2005) is to control for noise and some of the short-term transaction costs associated with the intervention. This may include discontinuities in previous policies, adoption of new strategies, as well as costs that are related to legal issues, consultancy services, due diligence, and any costs that may be associated with the corporate change. Each dummy equals zero for all periods for banks that did not experience any cross-border merger and acquisition.

Based on the aforementioned definitions for bank ownership and corporate changes, it is expected that the various measures will explain the variations in the cost-efficient frontier. This will allow assessing the effect of institutional differences on the efficiency estimate. Eventually, one is able to examine which of these ownership effects dominates the efficiency of the Ghanaian banking system after financial liberalisation.

3.2.2 Competition

Proponents of financial liberalisation suggest that as a consequence the banking system will become

more efficient through competition. A considerable number of studies have suggested that better institutions will promote greater competition in an economy. Several developing countries have taken measures to lower entry barriers, abolish interest rate ceilings, and privatise government-owned financial institutions. Some advocates of universal banking have also argued that competition can be stimulated by despecialising development financial institutions (DFIs) and commercial banks. From this perspective, the Ghanaian authority has replaced the 3-pillar banking model (development, merchant and commercial banking) with universal banking (Note 3). The motivation is to level the playing field, and open up the system to competition, product innovation and entry. A dummy variable *(UNIVERSAL)* is set to take a value of one from the period when universal banking was introduced, and zero otherwise (Note 4).

3.2.3 Bank Size

Variation in the location of the cost-efficient frontier is allowed by bank size. Banks with larger asset holdings may operate more efficiently than their counterparts due to the use of different production technology. The evidence in the academic literature is mixed and inconclusive on this issue, as previous empirical studies have yielded different results.

It is also possible that banks of different sizes serve different groups of customers, and as a result, may face different levels of competition. From this perspective, the size indicator is expected to explain the efficiency of banks. Bank size *(LOGASSETS)* is measured as the natural logarithm of total assets.

3.2.4 Other Control Variables

As a robustness check, inflation *(INFLATION)* and the Bank of Ghana average quarterly discount rate *(DISRATE)* are used as macroeconomic indicators to establish whether these additional variables influence the estimated relationships between efficiency and the main variables of interest, which in this case, are the indicators of bank governance, competition and bank size. Whereas high discount rates can increase the interest costs of banking operations and reduce their efficiency levels, inflation reduces the real value of banks' capital and increases their operating costs. Inflation is measured as the annual percentage change in the consumer price index (CPI).

The following regression model is estimated for the determinants of cost efficiency in the Ghanaian banking system:

$$\begin{aligned} EFF_{it} &= \alpha_0 + \delta_1 EXIT_{it} + \delta_2 ENTRY\_FOR_{it} + \delta_3 ENTRY\_DOM_{it} \\ &+ \delta_4 STATIC\_FOR_{it} + \delta_5 STATIC\_DOM_{it} + \delta_6 STATIC\_STA_{it} \\ &+ \delta_7 SELECT\_FOR_{it} + \delta_8 DYNAM\_ST_{it} + \delta_9 DYNAM\_LT_{it} \\ &+ \delta_{10} UNIVERSAL_{it} + \delta_{11} LOGASSETS_{it} + \delta_{12} DISRATE_t \\ &+ \delta_{13} INFLATION_t + w_{it} \end{aligned} \quad (2)$$

3.3 Data Sources and Classification

The data for this study were sourced from Bank of Ghana (BOG), which publishes balance sheet and income statement data for various Ghanaian banks. The dataset is an unbalanced panel that covers 28 banks over the period 1997-2008 with a sample size of 222 observations. The unbalanced panel dataset

varies from 14 banks in 1999 to 25 banks in 2008. The study period has been chosen to reflect the post-liberalisation phase of the financial sector reforms period (Tables 1 and 2 report the summary statistics of the variables used in the empirical analysis).

The macroeconomic variables (discount rates and inflation) are obtained from the IMF International Financial Statistics and World Economic Outlook databases.

Table 1. Descriptive Statistics of Variables Used in Cost Efficiency Estimation for the Period 1997-2008

Variables	Obs.	Mean	Std. dev.	Min.	Max.
ln *OC*	222	14.2096	1.4381	9.3709	17.0711
ln *w*	222	3.3974	0.8028	1.4005	6.2904
ln *LN*	222	12.4591	1.8057	7.3542	16.2230
ln *DP*	222	12.9770	1.5782	8.5796	16.1151
1/2 (ln *w*) ²	222	6.0920	2.7928	0.9807	19.7846
1/2 (ln *LN*) ²	222	79.2374	21.8185	27.0419	131.5935
1/2 (ln *DP*) ²	222	85.4414	20.0878	36.8047	129.8474
ln *LN* ln *DP*	222	164.3029	41.4215	63.0958	261.4351
ln *w* ln *LN*	222	41.8846	10.0399	15.2941	68.9730
ln *w* ln *DP*	222	43.7684	10.4470	14.2039	74.5123
T ln *w*	222	23.0004	10.9713	1.4005	53.3174
T ln *LN*	222	91.5563	51.7788	7.4804	194.6764
T ln *DP*	222	94.9057	52.3931	8.9828	193.3806
T	222	7.0496	3.5098	1.0000	12.0000
1/2 *T* ²	222	30.9797	24.0817	0.5000	72.0000
CRD	222	0.1161	0.1387	0.0093	0.8749
CAP	222	0.1159	0.2861	-0.3474	1.8148
LIQ	222	1.1130	0.2177	0.1898	3.1620

Source: Bank of Ghana (BOG) database.

Table 2. Descriptive Statistics of Variables Used in Bank Inefficiency Correlates for the Period 1997-2008

Variable	Obs.	Mean	Std. dev.	Min.	Max.
EXIT	222	0.0180	0.1333	0.0000	1.0000
ENTRY_FOR	222	0.2703	0.4451	0.0000	1.0000
ENTRY_DOM	222	0.3333	0.4725	0.0000	1.0000
STATIC_FOR	222	0.1081	0.3112	0.0000	1.0000

STATIC_DOM	222	0.0541	0.2266	0.0000	1.0000
STATIC_STA	222	0.1622	0.3694	0.0000	1.0000
SELECT_FOR	222	0.0541	0.2266	0.0000	1.0000
DYNAM_ST	222	0.0270	0.1625	0.0000	1.0000
DYNAM_LT	222	0.0901	0.6317	0.0000	6.0000
UNIVERSAL	222	0.5676	0.4965	0.0000	1.0000
LOGASSETS	222	13.4419	1.5678	8.8352	16.6113
DISRATE	222	23.5256	9.8381	12.7500	45.0000
INFLAION	222	17.9315	6.9548	10.1510	32.9060

Source: Bank of Ghana (BOG) database. IMF, IFS/WEO databases.

Out of the 28 banks with 222 observations in the sample, 21.43% were identified as active without experiencing any corporate ownership change. Of these banks, 7.14% were identified as foreign-owned, whereas 3.57% and 10.71% were identified as private domestic and state-owned banks, respectively.

The selection governance indicator employed in this study identified only one type of ownership change, which is mainly of cross-border merger and acquisition.

The financial sector reform process has led to a substantial increase in bank entry. The entry governance indicators show two types of change in this study. The number of banks identified as new foreign entrants constitutes 39.29% of the sample, whereas new private domestic entrants account for 28.57% of the total. Overall, 67.86% of the sample are classified as new entrants.

Two state-owned banks were closed by means of liquidation.

4. Empirical Results

Cost efficiency frontier and bank inefficiency correlates were estimated on a panel of unbalanced sample. The results show a number of relevant implications of the cost function of Ghanaian banks and their correlates with inefficiency. Tables 3 to 5 report the results of the estimates. Robustness analysis are also conducted on the main findings, and the results are unaffected. Table A.1 in Appendix reports the results of the robust estimates.

4.1 Average Cost Efficiencies

Tables 3 and 4 report the average measured bank efficiency scores by year at the sample means for banks classified by size, and by ownership status, respectively. The efficiency estimates take a maximum value of 1, indicating the best practice bank in the sample; and a minimum value of 0, corresponding to the most inefficient bank.

The results in Table 3 are reported by bank size and year. There appear to be fluctuations in the mean efficiency scores in the entire banking industry. Apart from the mean efficiency score for large banks which fell marginally from 87.44% in 1997 to 86.09% in 2008, all the other banks classified according to sizes managed to improve their mean efficiency scores over the same period. On average, large and

medium banks appear to be more cost efficient than small banks. Overall, the results suggest a mean efficiency score of 0.7553 for the full sample. This suggests that, when evaluated at the sample mean data point, the average bank is 75.53% efficient, or equivalently incurs 24.47% higher costs than the best practice bank facing the same conditions. On economic grounds, the mean cost inefficiency level suggests that, given their output level and mix, the average Ghanaian bank needs to reduce its production costs by 24.5% in order to use its inputs as efficiently as the most efficient Ghanaian bank. This finding is interpreted as evidence of only limited gains in managerial efficiency having arisen from financial liberalisation.

The results in Table 4 are reported by governance indicators and year. Apart from the mean efficiency score for foreign banks, *STATIC_FOR*, which fell marginally from 91.85% in 1997 to 90.22% in 2008, all the other banks classified by governance indicators appear to have improved their mean efficiency scores over the same period. On average, the only bank selected for cross-border merger and acquisition, *SELECT_FOR*, seems to be more cost efficient than banks classified according to any of the governance indicators. This is followed by foreign banks, *STATIC_FOR*, and state-owned banks, *STATIC_STA*. Both new and established private domestic banks, *ENTRY_DOM* and *STATIC_DOM*, exhibit the lowest average cost efficiency measures. New foreign banks, *ENTRY_FOR*, also appear to be better at managing their costs than private domestic institutions.

Table 3. Efficiency Scores by Bank Size and Year, 1997-2008

Period	Large banks	Medium banks	Small banks	Full sample
1997	0.8744	0.7644	0.6249	0.7311
1998	0.8703	0.9006	0.6281	0.7387
1999	0.8744	0.7471	0.6452	0.7461
2000	0.8630	0.9231	0.6686	0.7528
2001	0.8674	0.9301	0.6829	0.7583
2002	0.8774	0.9083	0.6919	0.7654
2003	0.8757	0.9398	0.6891	0.7605
2004	0.8850	0.9180	0.6981	0.7675
2005	0.8451	0.8022	0.6703	0.7391
2006	0.8501	0.8103	0.7250	0.7633
2007	0.8549	0.8306	0.7269	0.7651
2008	0.8609	0.8624	0.7510	0.7754
Average	0.8666	0.8614	0.6835	0.7553

Note. Large banks: assets > 10% of industry total assets. Medium banks: 10% > assets > 5% of industry total assets. Small banks: assets < 5% of industry total assets.

Table 4. Efficiency Scores by Governance Indicators and Year, 1997-2008

Period	Entry_For	Entry_Dom	Static_For	Static_Dom	Static_Sta	Select_For
1997	0.6740	0.6331	0.9185	0.5676	0.7591	0.9288
1998	0.6826	0.6433	0.9211	0.5790	0.7664	0.9354
1999	0.6911	0.6533	0.9237	0.5902	0.7736	0.9378
2000	0.7152	0.6777	0.9262	0.6012	0.7805	0.9390
2001	0.7232	0.6945	0.9286	0.6121	0.7873	0.9499
2002	0.7310	0.7034	0.9310	0.6227	0.7939	0.9572
2003	0.7387	0.6905	0.9333	0.6332	0.8003	0.9634
2004	0.7461	0.6994	0.9355	0.6434	0.8066	0.9712
2005	0.7165	0.6734	0.8917	0.6214	0.7728	0.9465
2006	0.7827	0.6939	0.8953	0.6320	0.7799	0.9588
2007	0.7727	0.7028	0.8988	0.6423	0.7867	0.9589
2008	0.7867	0.7115	0.9022	0.6524	0.7934	0.9676
Average	0.7301	0.6814	0.9172	0.6165	0.7834	0.9512

Note. See Table 5.2 for variable definitions of governance indicators.

4.2 Bank Inefficiency Correlates

Employing the conditional mean model of Battese and Coelli (1995), factors that are correlated with bank inefficiency are investigated in the Ghanaian banking sector. In the model, (in)efficiency is derived from the cost function in equation (1) and subsequently expressed as a function of a vector of predictor variables. The results of this investigation, which include governance indicators, competition, and bank size, are presented in Table 5.

4.2.1 Bank Governance

The estimate in Table 5 shows that apart from the two dynamic variables (*DYNAM_ST* and *DYNAM_LT*), all the governance indicators have a statistically significant relationship with cost (in)efficiency. The omitted dummy variable among our governance indicators is bank exit, *EXIT*. Thus, the cost (in)efficiency with respect to bank governance is measured relative to this category. As expected, the results show that the two state-owned banks selected for closure were less cost efficient than other banks in the sample. The closure decision made by Bank of Ghana appears to be justified on cost efficiency grounds.

Table 5. Parameter Estimates of Bank Inefficiency Correlates

Variable	Parameter	Coefficient	Standard error	T-statistic
Constant	α_0	-2.5433*	1.3078	-1.94
Bank governance				
ENTRY_FOR	δ_2	-0.5271***	0.2008	-2.63
ENTRY_DOM	δ_3	-0.5056**	0.2161	-2.34
STATIC_FOR	δ_4	-0.7250***	0.2413	-3.01
STATIC_DOM	δ_5	-0.3963**	0.1981	-2.00
STATIC_STA	δ_6	-0.6352**	0.2477	-2.56
SELECT_FOR	δ_7	-0.7865***	0.2571	-3.06
DYNAM_ST	δ_8	0.0099	0.1163	0.09
DYNAM_LT	δ_9	0.0028	0.0272	0.10
Competition				
UNIVERSAL	δ_{10}	0.0225	0.0386	0.58
Bank Size				
LOGASSETS	δ_{11}	-0.8066***	0.0671	-12.02
Statistic				
Gamma	γ	0.9274***	0.2120	4.3745
LR-test	Ψ	70.3371***		
No. of obs.	N	222		

Note. The symbols *, ** and *** denote significance levels of 10%, 5% and 1%, respectively.

All the newly established private banks, *ENTRY_DOM* and *ENTRY_FOR*, that entered the market operate at relatively high levels of cost efficiency. The effect of each category also appears to be very similar in magnitude.

The lower cost efficiency of the newly established foreign banks, *ENTRY_FOR*, relative to established foreign banks, *STATIC_FOR*, can be traced from one important factor. In attempting to establish their presence in the Ghanaian banking industry, many of the new foreign banks poached staff from established financial institutions (both banks and non-banks), by offering high salary and incentive packages. This was especially common among newly established Nigerian banks that entered the market from 2005 onwards. A large number of senior management and ordinary staff were poached, especially during the period 2006-2007. Staff turnover in the banking industry was high during this period. New staff that had no prior experience in banking, and had not been poached from elsewhere, received twice the salary earned by their peers in other established financial institutions. Apart from generous incentive packages, most new foreign banks were willing to offer high salary packages, which may as a consequence, have made them less cost efficient than the established foreign banks.

The ability to pay high salaries arose from the fact that the newly established foreign banks had support from their parent companies. Concerns were raised as to how long this practice could be sustained. One would expect that the human capital investment made by the newly established foreign banks would eventually pay off, considering the fact that they had managed to bring into their teams a considerable number of staff and management with knowledge of local conditions in the banking industry. However, the unreasonable targets set by some newly established foreign banks forced a quite number of their workers to resign prematurely, as they were unable to meet their targets, and saw their salaries and incentives reduced accordingly. This added to the relatively high labour turnover in the banking industry during this period. Newly established foreign banks had to raise their game in order to compete with established banks. In spite of these efforts, the results of this study suggest they have not achieved the same levels of cost efficiency as their established foreign peers.

Among the group of static governance indicators, the result shows that established foreign banks, *STATIC_FOR*, are more cost efficient than state-owned, *STATIC_STA*, and established private domestic, *STATIC_DOM*, banks; with the latter showing the lowest average cost efficiency in the Ghanaian banking sector. This is partially consistent with theory which assumes that state-owned banks in developing countries are less cost efficient than their peers due to pervasive market inefficiencies and outmoded banking practices. In the Ghanaian context, our result shows that state-owned banks are more cost efficient than their established private domestic peers.

Despite the inefficiencies of government banks that are widely documented in developing economies, after the three phases of liberalisation in the Ghanaian banking sector, state-owned banks appear to have improved their efficiency levels according to the results reported in Table 5. There is also evidence that state-owned banks are more cost efficient than either foreign-owned, *ENTRY_FOR*, or private domestic, *ENTRY_DOM*, banks that have just entered the market. This suggests that a strengthening of operational procedures, and the existence of improved supervisory and regulatory systems, have helped to reduce the cost inefficiency of state-owned banks.

It is, however, noteworthy that the established foreign banks, *STATIC_FOR*, exhibit the highest average cost efficiency among the groups reported in Table 5. All of these banks were established during the colonial period; notably, Barclays and Standard Chartered. From this perspective, it appears that as a result of maintaining a long-term presence in the Ghanaian banking sector, these banks have managed to overcome the informational disadvantages they might have experienced with respect to local banks. In geographical areas where they had consistently operated inefficiently, these banks have closed down their branches, despite adverse public opinion.

The higher cost efficiency of established foreign banks relative to domestic banks is also consistent with the theory that suggests foreign banks in developing economies have advantages over their domestic counterparts, such as superior management practices and technological processes (Claessens et al., 2001). As private domestic banks replicate and assimilate the modern banking technology and skills introduced by foreign banks, it is expected that this group of local banks would combine the

modern practices with knowledge of local conditions they have to improve their efficiency levels.

The coefficient on banks selected for cross-border merger and acquisition, *SELECT_FOR*, is highly significant at the 1% level with a coefficient of 0.7865. This suggests that the only foreign-acquired bank has operated at a relatively high level of cost efficiency. This has been driven mainly by redundancy programmes and layoffs, and without branch networks expansion following the acquisition. The experience in this case is therefore contrary to the received wisdom that most mergers and acquisitions result in failure (see, for example, Havrylchyk, 2006).

Moreover, considering the fact that Societele Generale had been operating in neighbouring Francophone West African countries of Benin, Burkina Faso, Cameroon, Ivory Cost and Senegal; it had the opportunity of learning about the Ghanaian banking industry due to proximity. In addition, the wholly owned subsidiary of Societele Generale by name Genetifec, had previously dealt with the corporate shareholders of the acquired bank (SSB Ltd). This alliance created the opportunity for a Francophone bank (Societele Generale) to carefully enter into merger and acquisition with an Anglophone Ghanaian Bank (SSB Ltd); where the former through prior experience managed to learn about the culture and legal system, as well as the general business and banking environment prevailing in Ghana. This suggests that the acquirer (Societele Generale) carefully selected a bank (SSB Ltd.) with a strong domestic base for acquisition. The Ghanaian government may also have exercised care in approving a foreign acquisition, in an attempt to avoid undermining the reforms.

In examining the dynamic effects of cross-border merger and acquisition, the results suggests that neither the short-term (*DYNAM_ST*) nor the long-term (*DYNAM_LT*) effects of governance changes has any statistical significant effect on measured cost (in)efficiency. This is a clear indication that the persistence of new policies and strategies adopted by the merged and acquired bank can only be fully realised after a passage of time.

4.2.2 Competition

As a measure of competition, the universal banking dummy variable, *UNIVERSAL*, though statistically insignificant is found to be positively related with measured cost (in)efficiency. As mentioned earlier, some advocates of universal banking argue that by despecialising development financial institutions (DFIs) and commercial banks, competition could be stimulated. The result of this study is found to be inconsistent with this argument, which may stem from the fact that before the Ghanaian authority replaced the 3-pillar banking model (development, merchant and commercial banking) with universal banking in 2003, banks were already engaged with universal banking activities to some extent before their licenses were officially changed. One can argue from this perspective that financial liberalisation has had only a limited effect on competition, because to a large extent banks continue to practice what they used to before the reforms.

4.2.3 Bank Size

The result shows that measured cost (in)efficiency is inversely related to bank size, *LOGASSETS*. The coefficient is significant at the 1% level. Though the established literature offers no consensus on this

issue, there is evidence from this study that larger banks are significantly better at managing their costs than smaller institutions. This is consistent with the conventional wisdom which assumes that as banks grow larger, they are expected to control costs more effectively.

5. Conclusion

To examine the effects of financial liberalisation in Ghana, I empirically investigate the efficiency of its banking system from the period 1997 to 2008. Initially, I focus on the cost efficiency of banks to show the degree of progress that has been made in the banking sector after liberalisation. This is based on the expectation that greater cost efficiency should be associated with improved banking practices and better functioning institutions through the market structure and regulatory framework under which banks operate. The evidence of these results suggests the need for new foreign banks to develop understanding of the local conditions before they can adequately compete with their established foreign peers. Moreover, considering the high contribution to cost efficiency of the established foreign-owned banks and their long-term presence in Ghana, I suggest that the full benefits of foreign entry should materialise gradually over time.

Also, it may take longer for smaller banks, especially foreign-owned banks that have recently entered the market, to compete with the long-established larger institutions that have used their knowledge of local conditions, coupled with the restructuring exercise, to improve their cost efficiency. However, I recommend that the banking market should remain open to entry, and allow for market-led consolidation of smaller institutions. With the minimum capital requirements raised by the monetary authority, and expected to be reached during the period 2009-2012, I envisage that further consolidation of smaller institutions is a likely future development.

I therefore suggest that smaller banks, especially foreign-owned, could be encouraged to merge with established non-bank financial institutions that have adequate knowledge of local conditions. One such merger (UT Financial Services and BPI Bank) has been in progress at the time the writing of this paper was in progress. In the future, we expect the so-called “big giants”, which have long-term experience in the Ghanaian banking industry, to face enhanced levels of competition. From a policy point of view, I conclude that even a liberalised financial system cannot be characterised by perfect competition, because of the need for risk pooling. At best, a liberalised system can achieve a form of oligopolistic competition that tolerates some degree of functional inefficiency. Thus, the cost of financial services might decline less than it would under perfect competition.

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Notes

Note 1. See Berger and Humphrey (1997) for an excellent review of the established literature on the effects of financial deregulation on bank efficiency and productivity.

Note 2. For a review of the literature on bank governance, see for example, the studies of Beck et al. (2005a, 2005b), Nakane and Weintraub (2005), Berger et al. (2005), and Williams and Nguyen (2005).

Note 3. All the specialised banking institutions since the 1970s have accepted deposits and undertaken commercial banking activities before the replacement with universal banking occurred.

Note 4. In the Ghanaian context, universal banking began in the year 2003, although banks have somewhat engaged in these activities before they had their license changed.

Appendix

Table A.1. Robust Estimates of Bank Inefficiency Correlates

Variable	Parameter	Coefficient	Standard error	T-statistic
Constant	α_0	-2.3030*	1.3063	-1.76
Bank governance				
ENTRY_FOR	δ_2	-0.5156**	0.1996	-2.58
ENTRY_DOM	δ_3	-0.5092**	0.2153	-2.36
STATIC_FOR	δ_4	-0.7304***	0.2404	-3.04
STATIC_DOM	δ_5	-0.3873**	0.1970	-1.97
STATIC_STA	δ_6	-0.6277**	0.2460	-2.55
SELECT_FOR	δ_7	-0.7916***	0.2556	-3.10
DYNAM_ST	δ_8	0.0227	0.1156	0.20
DYNAM_LT	δ_9	0.0012	0.0270	0.04
Competition				
UNIVERSAL	δ_{10}	0.0243	0.0404	0.60
Bank Size				
LOGASSETS	δ_{11}	-0.8043***	0.0667	-12.05
Macroeconomic				
DISRATE	δ_{12}	-0.0017	0.0042	-0.41
INFLATION	δ_{13}	-0.0024	0.0018	-1.33
Statistic				
Gamma	γ	0.9306***	0.2149	4.3304
LR-test	Ψ	47.3863***		
No. of obs.	N	222		

Note. The symbols *, ** and *** denote significance levels of 10%, 5% and 1%, respectively.